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Editorial

The Art and Science of Medicine

The above centuries-old saying known to every doctor had been considered as a reminder that to study, practice or teach medicine, you should have knowledge (Science) of the subject of medicine and the art of delivering it either to the students or the patients. The saying found its true significance century's later when evidence-based medicine (EBM) was mentioned in 1991 by Gordan Guyatt and elaborately described by the EBM working group of the same university (McMaster University of Canada) in 1992. A revolution soon took place that rapidly changed what norms for centuries were. The traditions of blindly and faithfully following seniors, or sometimes strict adherence to the principles of practices of certain hospitals, were challenged, and soon the EBM was followed all over by the majority of clinicians and academicians. The talent of physicians, skills of surgeons and knowledge of teachers were not challenged but was given a solid base on which progress could be made (Documentation, classification and scientific analysis and approval or disapproval of treatment and teaching methodology).

Art and science became essential components of discovery called EBM. In 2007 British Medical Journal published a list of 15 important discoveries of the last 167 years in the field of medicine. Among the critical discoveries and milestones are the discovery of antibiotics, development of vaccines, safe anesthesia procedures, the discovery of DNA, etc. and EBM. The self-explanatory term refers to our treatment approaches based on evidence observed from the results obtained by similar approaches for similar situations. It is a drift from situations where senior doctors only give a final opinion, to surveillance of others' results in similar situations for final decision making. To look for the outcome of the similar procedures of other centers doesn't undermine the talent and sometimes extraordinary intuition of practitioners who can compute the signs and symptoms in their mind and deliver services (Opinion) to patients; ultimately, they are the ones who skillfully and confidently will administer the treatment. EBM will help to process, classify, document and make skills reproducible by others in other places in the field also.

Though initially taken for research but gradually busy clinical doctors also adopted the procedures. Finally, the first database of physicians was established in 1992 in Cochrane, called Cochrane collaborators and soon followed by another center in McMaster University in 1994. What is that to us? How can this help us? The advent of information technology (IT) and the availability of devices from PCs to laptops, tablets and palmtops made access to information very simple, fast and universal. Every doctor at any time can evaluate himself, if his procedures match other centers' results and sometimes ask for help or comparison of treatments and or adopting new treatment options. No matter how busy a doctor is, his treatment modalities and successful outcomes should be based on evidence and be expressible, reproducible and simplified for computing and preservation.

The problem is how to identify the right evidence and assess its usefulness in little time that busy doctor has for this. To find the best treatment possible for the patient is the science of medicine, and how much, how and to whom the doctor offers the treatment is the art of medicine. This is where art and science of medicine fuse. To apply EBM, get familiar with its principles, and look for particular evidence, the following points may be considered:

1. Is the article valid, based on results? The proportional size of the samples, the way they are collected and assessed should be satisfactory by the users.
2. What are the results? Do the results validly convey a clear message and easily understood? One reason doctors lose interest in going through an article is the complicated language used by statisticians who have done the analytical part of the job.

3. How the results may be applied at a practical level for the patient's care? The application of the method should not harm the patients (What harm was delivered to patients during earlier procedures should not be applied to patients under new protocol or study). The results obtained by others should be justified by sample size and other parameters to be risk-free and applicable in another particular situation.

To understand the standard of an article, the reader should know what confidence interval and p value are. P value is the probability of the treatment effect that can occur in a long run of identical trials due to the chance alone. The P value of equal or less than 0.05 is consistent with statistical significance. Confidence interval is the range of values within which we can be confident that the whole population's actual value lies. Ninety five percent is the standard of the confidence interval, which means there is 95% certainty that the actual value of the measured variable lies within the stated range. Once the doctor believes and wants to practice evidence over an opinion, he should know the reliability of reference articles and differentiate between low and high-quality research paper. As already mentioned the easy access to the internet has also added to the problem of unreliability. The internet is also full of unreliable articles without solid grounds. For this, understanding EBM pyramid of evidence is useful.

1. The bottom level of the pyramid, which is very wide and covers large spaces in literature, is an expert opinion that has little place in standardizing a procedure or be used for comparison. Different views from different clinicians and reader can't decide which one to follow, so it is considered the lowest level of evidence. However, such evidence may guide a reader on how to be a good observer, producer or encourage them to ponder on happenings around them. The discovery of penicillin by Alexander Fleming is an example of observations and intellectual analysis that helped everyone.

2. Case series and case-control studies and reports, are at a higher level of evidence: case series (Multiple patients) and case reports (Single patient). Here, there is no comparison with the control group and the report is made, based on variables thought to be linked to the outcome of interest. Though not a reliable tool for comparison and adoption as a technique, it can be a source of further research and hypothesis for future studies. Case-control studies, on the other hand, have a control group, a similar group without the outcome of interest. They are always retrospective. Using this design, the groups are analyzed for previous exposure to a suspected (Harmful) agent or procedure to determine if the agent, procedure is associated with target outcome. This type of study is subject to the effect of confounding variables and other biases.

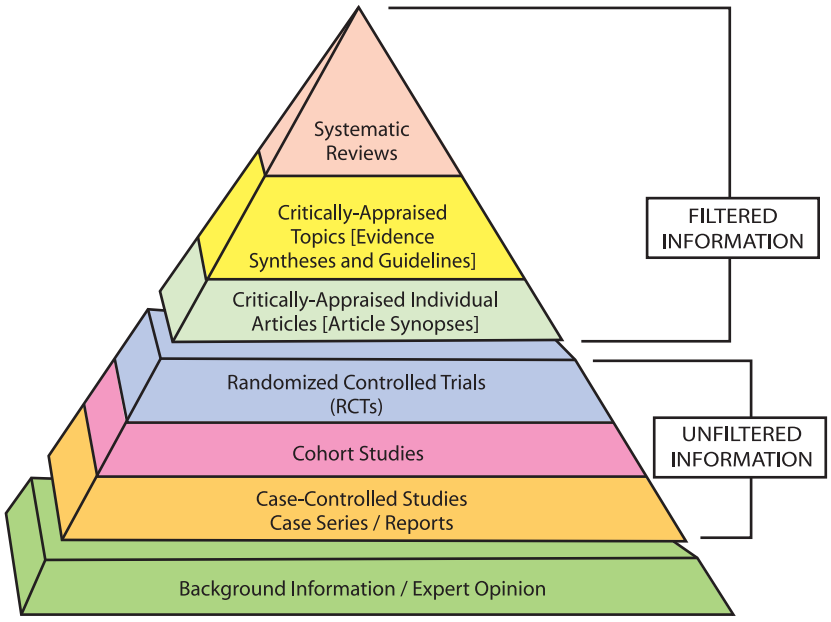
3. Cohort study, a reliable study design that can be both retrospective and prospective. A cohort is a group of individuals that share similar characteristics. In this type of study, equal-sized groups with or without interest exposure are followed up to determine the outcome. In a retrospective cohort study, the outcomes had already occurred before the study was initiated. Cohort studies are useful when looking at rare harmful outcomes. Again confounding variables may distort the relationship between study variables and outcome of interest.

4. Randomized Controlled Trials (RCTs), controlled study designs took another step forward, and RCT was introduced to the practice of medicine. Double-blind RCTs became the gold standard of research design with achievements, like trials, leading to the knowledge of the effectiveness of Salk polio vaccine. RCTs more openly contradicted conventional wisdom in favor of the evidence-based practice.

5. Critically appraised individual articles (Article synopsis, evidence synthesis), the intuition-based treatment gradually replaced by evidence-based medicine and there came a surge in publications and their availability online even before standard publishers print them, the question of selectivity came, how and whom to rely on? EBM which initially a set of notes for internal medicine residents and beginners, and was introduced in 1990 to enlighten them towards the more logistic use of diagnostic, prognostic and therapeutic technologies which in time made students smarter than older teachers! Still, too much of a good thing had happened too fast and too wide and had to be appraised. Critical appraisal was noted in 1980 by David Sackett, which described systematic examination of the medical literature to extract evidence, information etc. This became a very useful tool in EBM.

6. Systematic review, meta-analysis. The top of the EBM systematic review pyramid was developed by social sciences. The scientists developed tools for analyzing and drawing quantitative results from a large number of publications and their results. This, in turn, substantially improved the knowledge and made evidence of a large

number of groups at different localities easy to compile, design, understand procedures, and know results and find approval or disapproval of specific procedures. A systematic review is particularly important because it makes it possible for a large number of smaller groups to be included in studies and thoughts, to get the best viable option of care, and treatment for the Gravity Centre around which the universe of medicine rotates our patients.



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